



## IMS Distinguished Lecture

**Title:** The Renaissance of Halide Perovskites: Remarkable Solar Cell Materials

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**Date:** Thursday, April 28, 2016

**Time:** 2pm – 3pm

**Location:** MSL Auditorium (TA-03 - Bldg 1698 - Room A103)

**Abstract:** There is a renaissance in an old class of materials. Organic-inorganic hybrid perovskites are a special class of semiconductors that have revolutionized the prospects of emerging photovoltaic technologies in the form of both light harvesters and hole transport materials. The inorganic chemistry of this class of materials is fascinating. These compounds adopt the ABX<sub>3</sub> perovskite structure, which consists of a network of corner-sharing BX<sub>6</sub> octahedra, where the B atom is a divalent metal cation (typically Ge<sup>2+</sup>, Sn<sup>2+</sup> or Pb<sup>2+</sup>) and X is a monovalent anion (typically Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>); the A cation is selected to balance the total charge and it can be a Cs<sup>+</sup> or a small molecular species. Such perovskites afford several important features including excellent optical properties that are tunable by controlling the chemical compositions, they exhibit ambipolar charge transport with high mobilities. Some members exhibit long electron and hole diffusion lengths. The fundamental similarities and differences between MeNH<sub>3</sub>PbI<sub>3</sub>, MeNH<sub>3</sub>SnI<sub>3</sub> and MeNH<sub>3</sub>GeI<sub>3</sub> perovskites as well as other low dimensional materials will be discussed.

**Bio:** Mercuri Kanatzidis was born in Thessaloniki, Greece in 1957. After obtaining a B. Sc from Aristotle University in Greece, he received his Ph D. in chemistry from the University of Iowa in 1984. He was a post-doctoral research associate at the University of Michigan and Northwestern University from 1985 to 1987 and is currently the the Charles E. and Emma H. Morrison Professor of Chemistry at Northwestern University. Mercuri moved to Northwestern in the fall of 2006 from Michigan State University where he was a University Distinguished Professor of Chemistry since 1987.

His research areas include: Inorganic chemistry, solid state and coordination chemistry of chalcogenide compounds. Design of new materials, exploratory synthesis, thermoelectric materials, nanostructured materials, intermetallics, mesoporous semiconductors, phase-change materials, conducting polymers, intercalation chemistry applications of new materials. He is the recipient of many honors and awards, including: Presidential Young Investigator Award. National Science Foundation, 1989-1994; ACS Inorganic Chemistry Division Award: EXXON Faculty Fellowship in Solid State Chemistry, 1990; Beckman Young Investigator, 1992-1994; Alfred P. Sloan Fellow 1991-1993; Camille and Henry Dreyfus Teacher Scholar 1993-1998; Michigan State University Distinguished Faculty Award 1998; Sigma Xi 2000 Senior Meritorious Faculty Award; University Distinguished Professor MSU 2001; John Simon Guggenheim Foundation Fellow 2002; Alexander von Humboldt Prize, 2003; Morley Medal, American Chemical Society, Cleveland Section, 2003; Charles E. and Emma H. Morrison Professor, Northwestern University 2006; MRS Fellow 2010; Royal Chemical Society DeGennes Prize 2015; Elected Fellow of the Royal Chemical Society 2015; the ENI Award for the "Renewable Energy Prize" category; the ACS Award in Inorganic Chemistry 2016; and the American Physical Society 2016 James C. McGroddy Prize for New Materials.

He has over 950 papers (h-Index=87), 34,000 citations, and 22 patents to his merit.

Professor Mercuri also holds an appointment at Argonne National Laboratory and is the editor in chief of the Journal of Solid State Chemistry.

*Hosted by Alexander Balatsky \* Director of the Institute for Materials Science*